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PERKINS COIE LLP
P.O. BOX 2168
MENLO PARK, CA 94026

| EXAMINER | |
|---|---|
| SEFCHECK, GREGORY B | |
| **ART UNIT** | **PAPER NUMBER** |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/648,758 | HARES, SUSAN | |
| | Examiner | Art Unit | |
| | Gregory B. Sefcheck | 2616 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *25 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claim 1 is objected to because of the following informalities:

Claim 1 is contradictory in that a "system for exchanging routing information" is claimed in the preamble but the body of the claim includes the elements that comprise a "protocol", not a system.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 4-9, 11-14, 16-20, and 27-31 rejected under 35 U.S.C. 102(e) as being anticipated by Saleh et al. (US 20030058804A1), hereafter Saleh.

- In regards to Claims 1, 6,

Saleh discloses a system and protocol for operating a network of nodes connected by a number of links through the exchange of routing information (Abstract; Pg. 3, paragraph 26; Pg. 4, paragraph 55, 58, and 59; meets claim 1 – system for

exchanging routing information; claim 1 – networks include a plurality of interconnected nodes).

Saleh discloses that each node maintains an up-to-date view of the network topology that includes available nodes, links, and configured connections (path vectors) throughout the network (Pg. 4, paragraph 55; meets claim 1 – plurality of path vectors for routes included in routing information; claim 6 – each of nodes maintains a list of logically adjacent nodes).

Saleh shows that the network may be configured to contain two or more "zones" of nodes, thus resulting in a multi-level hierarchy (Pg. 5, paragraph 60). Saleh shows that this hierarchy enables the routing information databases maintained at select nodes to be expanded and/or summarized versions of the overall network topology based on the rank of each particular node (Pg. 4, paragraph 55, 58-60; meets claim 1 – multi-tier hierarchy amongst plurality of nodes such that networks are operative to expand or summarize the routing information to select nodes based on a rank of the select nodes; claim 1 – link-state database in each node including virtual topology of the networks such that each node is operative to generate the database from the routing information; claim 1 – database further includes the plurality of path vectors for routes in the networks).

Saleh shows that the routing information that makes up the topology databases at each node are broadcast (flooded) throughout the network using special protocol packets and procedures (Pg. 4, paragraph 55; meets claim 1 – flooding mechanism for exchanging the routing information amongst the plurality of nodes).

- In regards to Claims 4 and 5,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Referring to Fig. 2, Saleh shows the network can be divided into multiple zones that function as autonomous systems (meets claim 4 – networks include one or more autonomous systems; claim 5 – networks include two or more autonomous systems).

- In regards to Claims 7 and 8,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Referring to Fig. 2, Saleh shows that the list of logically adjacent nodes may reside in different zones of the network are based on logical adjacency, not physically adjacency (meets claim 7 – list of logically adjacent nodes are non-equivalent to physically adjacent nodes; claim 8 – two or more logically adjacent nodes reside on two or more distinct autonomous systems from one or more networks).

- In regards to Claim 9,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Referring to Fig. 15, Saleh shows that use of a node's database for route provisioning may utilize a shortest path first method (Pg. 11, paragraph 127; Pg. 17,

paragraph 197; meets claim 9 – each of the nodes is operative to populate the link-state database from a shortest path first algorithm).

- In regards to Claims 11-13,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Saleh shows that nodes of the network establish and maintain neighbor relationships, or adjacency, through the Hello Protocol, which involves the exchange of INIT packets, after which the nodes periodically exchange Hello packets, thereby establishing a "heart-beat" communication between nodes (Pg. 6, paragraph 75, 77, 82; claim 11 – each of nodes is operative to create adjacencies via a four-way handshake; claim 12 – protocol includes a hello message such that the hello message is exchanged periodically between adjacent nodes after four-way handshake;

The periodic hello messages are empty unless changes to the link-state of the node require the hello message to include information regarding those changes (Pg. 6, paragraph 77 and 82; Pg. 8, paragraph 97; claim 13 – hello message includes modified hello PDU with one or more additional parameters).

- In regards to Claims 14, and 16-18,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Saleh shows that the border nodes of each zone within the multi-level hierarchy are required to manage inter-zone routing as well as intra-zone routing through separate link-state databases. Saleh further discloses utilizing open shortest path first for determining routing through and between zones (Pg. 5, paragraph 59 and 60; claim 14 – multi-tier hierarchy includes one or more higher level tiers in communication via an exterior gateway protocol; claim 16 - multi-tier hierarchy includes one or more higher level tiers in communication via an interior gateway protocol; claim 17 – IGP is a link state protocol; claim 18 – IGP is OSPF or IS-IS).

- In regards to Claim 19,

Saleh discloses a method of configuring connections of nodes in a network (Pg. 5, paragraph 72; claim 19 – method of selecting routes at a first node in a network).

Saleh shows that nodes of the network establish and maintain neighbor relationships, or adjacency, through the Hello Protocol, which involves the exchange of INIT packets, after which the nodes periodically exchange Hello packets, thereby establishing a "heart-beat" communication between nodes (Pg. 6, paragraph 75; claim 19 – establishing a plurality of nodes logically adjacent to the first node including completing a four way handshake with each of the plurality of nodes).

Saleh discloses that nodes learn routing information about their neighbors through periodic exchange of Hello packets (Pg. 6, paragraphs 75-79; claim 19 – receiving a plurality of routing tables at periodic intervals from the plurality of adjacent nodes).

Saleh shows that the exchange of routing information through Hello packets enables each node to populate a database of the network topology that includes a plurality of routes between the nodes of the network (Pg. 4, paragraph 59; Pg. 5, paragraph 72; Pg. 6, paragraph 76; claim 19 – populating a routing table local to the first node including selecting a plurality of routes to the plurality of nodes from the routing tables).

Saleh shows that the routing information available to network nodes may include a path length field for routes (Fig. 21; Pg. 21, paragraph 247; claim 19 - selecting the plurality of routes including determining a path length for each of the plurality of routes and applying a policy vector to each of the routes).

Saleh also shows that routing information available to network nodes may include the quality of service available over links as well as one or more costs associated with each of the links (Pg. 6, paragraph 76). This information can then be used in provisioning and configuring routes (Pg. 11, paragraph 127;Pg. 17, paragraph 194; claim 19 – applying the policy vector includes generating one or more metrics for discriminating between the plurality of routes).

- In regards to Claim 20,

Saleh discloses a method of configuring connections of nodes in a network that covers all limitations of the parent claim.

Saleh shows that two or more QoS levels may be utilized for prioritizing the connections in the network (Pg. 4, paragraph 56; Pg. 6, paragraph 82; claim 20 – one or more metrics are in prioritized order).

- In regards to Claims 27-31,

Saleh discloses a method of configuring connections of nodes in a network that covers all limitations of the parent claim.

Referring to Fig. 15, Saleh shows that route provisioning and configuring is performed according to certain metrics, such as QoS, latency, cost, path length/distance, etc., stored in the network database (Pg. 6, Table 1; Pg. 11, paragraph 127; Pg. 17, paragraph 197; claim 27 – selecting one or more optimal routes form the plurality of routes based on one or more metrics; claim 28 – one or more optimal routes have minimal values for one or more metrics; claim 29 - one or more optimal routes ensure network is balanced; claim 30 - one or more optimal routes have minimal length; claim 31 – metrics includes a distance metric for each route indicating a length of an internal gateway path traversed by the routes).

## *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saleh in view of Callon (US 20020131362A1).

- In regards to Claims 2 and 3,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Saleh shows that the use of a multi-level hierarchy of nodes can speed up the calculations of routes (convergence) through the network.

Saleh does not explicitly show the convergence to be less than the average convergence of equivalent networks utilizing OSPF and BGP, specifically.

Callon discloses network routing using link failure information. Callon specifically shows that convergence time can be accelerated beyond that of networks utilizing OSPF or BGP (Abstract; Pg. 3, paragraph 30; meets claim 2,3 – convergence time of networks exchanging information is less than average convergence time for topologically equivalent network connected via OSPF/BGP).

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the system of Saleh such that convergence time is improved over networks connected via standard protocols such as BGP and OSPF, as shown by Callon, such that implementation of Saleh is an improvement over those standard routing and topology informative protocols that are well known and commonly used in the art.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saleh in view of Rochberger et al. (US006147971A), hereafter Rochberger.

- In regards to Claim 10,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Saleh does not explicitly disclose a shortest path first algorithm as a modified Dijkstra algorithm.

Rochberger discloses an optimized routing method/system utilizing a modified Dijkstra open shortest path first algorithm (Col. 7, lines 50-55; meets claim 10 – shortest path first algorithm is modified Dijkstra algorithm).

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the open shortest path first algorithm in Saleh through a modified Dijkstra algorithm, as taught by Rochberger, since Dijkstra is a commonly-used algorithm for determining the optimum route in a network.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saleh in view of McCollum et al. (US 20030120769A1), hereafter McCollum.

- In regards to Claim 15,

Saleh discloses a system and protocol for operating a network of nodes that meets all limitations of the parent claim.

Saleh does not explicitly disclose the exterior gateway protocol to be border gateway protocol.

McCollum discloses a system in which Border Gateway Protocol is used for route determination (Abstract; meets claim 15 – EGP is BGP).

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement border gateway protocol, as taught by McCollum, for communicating between higher level nodes in the system of Saleh, since BGP is a commonly-used protocol for path vector routing.

8. Claims 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saleh in view of Bressoud et al. (US 20030142682A1), hereafter Bressoud.

- In regards to Claims 21-26,

Saleh discloses a method of configuring connections of nodes in a network that covers all limitations of the parent claim.

Saleh does not explicitly disclose how to resolve ties between two or more routes.

Bressoud discloses a system and method for optimally configuring border gateway selection in a computer network. Bressoud shows that selecting routes includes resolving ties, such as routes having the same length, cost, etc. between two or more routes based on one or more BGP path metrics, including resolving ties between paths have different egress routers based on intra-domain cost (Pg. 2,

paragraphs 23-30; meets claim 21 – selecting the routes includes resolving ties between two or more routes; claim 22 – path length for the two or more routes are identical; claim 23 – resolving ties includes selecting a route from the two or more routes based on the one or more metrics; claim 24 – metrics includes BGP path attributes; claim 25 – metrics include BGP multi exit discriminator attributes; claim 26 – metrics includes autonomous system path lengths from the two or more routes).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Saleh such that selecting a routes includes resolving ties between two or more routes as shown by Bressoud. This would provide criteria for resolving ties during route selection in large networks and prevent protocol interruptions resulting from multiple routes that meet various requirements for selection.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Bauer (US20010017845A1)
- Cheng (US006529498B1)
- Rochberger et al. (US006208623B1)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory B. Sefcheck whose telephone number is 571-272-3098. The examiner can normally be reached on Monday-Friday, 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on 571-272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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6-4-2007

6/6/07
WING CHAN
SUPERVISORY PATENT EXAMINER